

CA2675: FLUID MECHANICS

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Fluid Mechanics

Subject Code

CA - Civil and Architectural Engineering

Course Number

2675

Academic Unit

Architecture and Civil Engineering (CA)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BC2675 Fluid Mechanics

Exclusive Courses

Nil

Part II Course Details

Abstract

The course will give the student a basic knowledge on fluid characteristics, fluid statics and buoyancy, dimensionless groups, fluid motion, laminar and turbulent flows. Also included is the application to the design of simple engineering structures against hydrostatic forces and fluid in closed conduits.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 app.)		DEC-A2	DEC-A3
1	Describe basic characteristics of fluid and significance of dimensionless numbers	25	x		
2	Demonstrate problem solving skills about the stability of floating bodies	25		x	
3	Demonstrate problem solving skills about the hydrostatic forces on simple structures	25		x	
4	Explain laminar and turbulent pipe flow problems	25		x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Students will gain knowledge about theory and, concepts of fluid mechanics	1, 2, 3, 4	
2	Tutorials	Students will engage in tutorial activities to practice problem solving skills	1, 2, 3, 4	
3	Experiments	Students will work in groups to put theory and concepts into practice	1, 2, 3, 4	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Laboratory Reports	1, 2, 3, 4	10	
2	Tests and/or assignments	1, 2, 3, 4	40	

Continuous Assessment (%)

Examination (%)

50

Examination Duration (Hours)

3

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%.

Assessment Rubrics (AR)

Assessment Task

Laboratory Reports

Criterion

1. ABILITY to USE/APPLY the methodology and procedure with ACCURACY in using the experimental techniques

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Tests and/or assignments

Criterion

1. CAPACITY for SELF-DIRECTED LEARNING to understand the principles of fluid mechanics

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

1. ABILITY to UNDERSTAND the taught methodology and procedures in using the modelling and calculation techniques
2. ABILITY to APPLY the scientific techniques in solving theoretical and application problems in fluid mechanics

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Fluid properties, hydrostatics, buoyancy, floatation, laminar and turbulent flow, dimensional analysis, similitude and scale model, fluid friction, pipe flow.

Reading List**Compulsory Readings**

Title	
1	Yunus A. Cengel and John M. Cimbala, Fluid Mechanics Fundamentals and Applications, 3rd edition, McGraw Hill Education, Singapore, 2014. ISBN: 978-1-259-01122-1.

Additional Readings

Title	
1	John F. Douglas, Janusz M. Gasiorek, John A. Swaffield and Lynne B. Jack, Fluid Mechanics, 5th edition, Prentice Hall, England, 2005. ISBN:-13: 978-0-13-129293-2.
2	Bernard S. Massey revised by John Ward-Smith, Mechanics of Fluids, 9th edition, Spon Press, London, 2012. ISBN13: 978-0-415-60259-4